Egyptian Journal of Surgery Vol. (20), No. (4), Oct., 2001

DIFFERENT APPROACHES IN CONSERVATIVE BREAST SURGERY

By
Yehia M. Safwat, Mona Aboul Enein, Mohammed Hassan Fahmy and Mohammed Ibrahim Awad.
From the Departments of Surgery and Oncology, Faculty of Medicine Cairo University.

This study was performed on 25 patients with operable breast cancer, all underwent Conservative breast surgery using three different approaches. In the first group, the Classic 2 incisions were used, a curved breast incision parallel to the areola and a transverse axillary incision. In the second group the axilla was evacuated through the curved breast incision, and in the third group the tumor was removed through the axillary incision. We compared the accessibility to the tumor and to the axillary contents, the rate of positive margins, the local recurrence and the cosmetic outcome.

INTRODUCTION

Conservative breast surgery (CBS) is now occupying a major segment in the treatment of breast cancer. The technique of the operation varies from one author to another. We introduced two new approaches in the type of incisions used for this operation, so our main aim is to evaluate the: accessibility in obtaining a negative margin, IBTR (Ipsilateral breast tumor recurrence) and cosmetic outcome of the different types of incisions in CBS.

PATIENTS AND METHODS

This is a prospective study done on 25 patients with primary operable breast cancer, fulfilling the criteria for CBS [1, 2]. The age of the patients ranged from 29-60 years, *17* patients were pre and 8 were postmenopausal. Clinically, the mass was impalpable in 2 patients (detected by mammography), was 2 cm in 10 patients, 3 cm in 9, and 4 cm in 4 patients. It was located in the upper outer quadrant (UOQ) in 18 patients, lower outer quadrant (LOQ) in 4, and axillary tail in 1 and retroareolar in 2. Fifteen patients were clinically NO, and 10 were NI [3].

Preoperative evaluation included routine clinical and laboratory evaluation, mammography, and breast ultrasound, then the diagnosis of malignancy was based on fine needle aspiration cytology (FNAC) in 16 cases, excisional biopsy in 7 and frozen section in 2 patients. A metastatic workup was performed including chest X-ray, bone scan and abdominopelvic ultrasound. All patients were M0 [3].

All patients then underwent CBS in the form of a wide local excision (WLE) and axillary dissection. 17 patients had their operation through 2 separate incisions [4], a curvilinear incision parallel to the areola, and a transverse axillary incision at the lower border of the axillary hairline extending from the pectoralis major muscle fold anteriorly to the latissimus dorsi muscle fold posteriorly.

Five cases, with their tumors in the UOQ, had their operation through a single curvilinear breast incision directly over the mass. After performing the WLE, the pectoralis major muscle is usually exposed, if not, the breast tissue is incised down to the muscle, and its lateral border identified and dissected free to expose the clavipectoral fascia and the interpectoral nodes, then axillary dissection is performed as usual. (Fig. 1 & 2)

Three patients with their tumors in the UOQ had their operations through a transverse axillary incision in the lower border of the axillary hairline. In these cases some [about one inch] extension of the axillary incision was required to gain good access to the breast tumor. After making the skin incision the subcutaneous plane is dissected towards the tumor using traction on the skin to get control of the umor then axillary dissection was performed as usual. (Fig. 3 & 4)

The tumors were removed in one piece and orientated with sutures for the pathologist. After hemostasis, the wounds were closed with absorbable subcutaneous sutures and then absorbable or nonabsorbable subcuticular sutures. Suction drain was applied in the axilla only, and if the breast cavity was separate from the axilla it was not drained and left to fill with seroma that would later organize [5].

Pathological evaluation of the specimen revealed invasive ductal carcinoma NOS in 21 patients, tubular in 2, mucoid in 1 and medullary in 1. EIC (Extensive in-situ component) was present in 10 cases. Tumors were grade I in 2 patients, grade II in 21 and grade Ill in 2. Nodal status was pNO in 9 patients, pNlbi in 8, pNlbii in 6 and pNlbiii in 2 [3]. ER was positive in 11, negative in 13 and unknown in 1 patient. Five cases had a positive margin and all were re-excised to a negative margin.

All patients then received external beam irradiation over the entire breast plus the internal mammary and supraclavicular nodes in a dose of 5000 cgy over 25 sessions over 5 weeks, and then a boost of 1600 cGy over 8 sessions over one and a half week on the tumor bed by electron beam E10-E15 according to the thickness of the breast. Adjuvant chemotherapy was given to all our patients in the form of FAC or CMF according to the cardiac status. Tamoxifen was also administered to all patients with positive or unknown receptor status.

Patients were examined three times weekly in the first two months, then every 3 months. Ultrasound was obtained every 6 months and a yearly mammogram was performed. Follow-up evaluation included:

1- Cosmetic results according to table 1.
2- Early detection of IBTR.
3- Evaluation of the patient's psychological status.

RESULTS

All our patients went through the procedure uneventfully apart from some minor complications including seroma development in 6, breast edema in 7, limb edema in 1. One patient died from an unrelated cause one year postoperative.

Regarding the surgical accessibility to removal of the tumors in the UOQ and the axillary nodes we found that using a single breast incision offers very good access to both the tumor and the axilla$_1$ with no need for excessive traction or wound enlargement to obtain full axillary evacuation. On using the single axillary incision, it was difficult but not impossible to gain good control of the primary tumor, but sometimes excessive skin traction or wound extension is required to do so.

The 5 cases with a positive margin were all in the "2 incisions [1] group. Out of these 5 cases, an EIC was present in 4. As mentioned before, all these cases were re-excised to a negative margin. Two patients developed an IBTR one year after surgery. They were in the single breast incision group ($p=0.038$ and a negative predictive value $r = -0.426$), had a negative margin from the start, were EIC positive ($p=0.087$), had a tumor size of 3 and 4 cm, were above 40, grade II, and one was pNO and the other pNl,

The cosmetic results of surgery and radiotherapy were assessed regularly in most patients, those from radiation therapy was in the form skin erythema, breast edema, dry desquamation. Skin burn developed in 2 patients which resolved after one month. Cosmetic results were acceptable by most of our patients especially with the hidden axillary incision (Fig. 5).Only one patient had a poor outcome after wound infection and healing by secondary intention. (Table 2)

The only factors that affected the cosmetic outcome were the tumor site, size and type of incision. It was found that tumors that were 2-3 cm had good or excellent outcome as compared with tumors that were 4 cm in size ($p=0.007$) (Fig. 6). The site of the tumor also affected the cosmetic outcome as tumors in the UOQ and axillary tail had better results than retroareolar and LOQ tumors ($p=0.06$). The best cosmetic results were obtained by tne single axillary incision in which 100% of patients had excellent cosmetic result, 80% of patients with the single breast incision had an excellent outcome ($p=0.01$) Table 2. Other factors like patient's age, tumor grade and re-excision to a safety margin did not influence the cosmetic outcome.

Table 1: ***Four-point scoring system of breast cosmoses (6).***

Cosmetic results of surgery	*Description*
Excellent	Treated breast almost identical to untreated breast
Good	Minimal differences between both sides
Fair	Obvious difference between both sides
Poor	Major functional and aesthetic sequelae in the treated breast

Table 2: *Cosmetic outcome.*

Incision Type \ *Cosmetic outcome*	*Excel1ent*	*Good*	*Fair*	*Poor*	*Total*
Axillary	3 (100%)	-	-	-	3 (100%)
Breast	4 (80%)	1 (20%)	-	-	5 (100%)
2 incisions	3 (18%)	9 (53%)	4(23%)	1(6%)	17 (100%)
Total	10 (40%)	10(40%)	4(16%)	1(4%)	25 (100%)

Table 3: *Indications and contraindications of CBS (5).*

Indications	*Stage I and II*
Absolute contraindications	1 -First or second trimester of pregnancy.
	2 -Two or more gross tumors in separate quadrants of the breast.
	3 -Diffuse intermediate or malignant appearing microcalcifications.
	4 -History of therapeutic irradiation of the breast region.
Relative contraindications	1 - Large tumor-to-breast ratio.
	2 - History of collagen vascular disease.
	3 - Large breast size.
	4 - Tumors iocated beneath the nipple

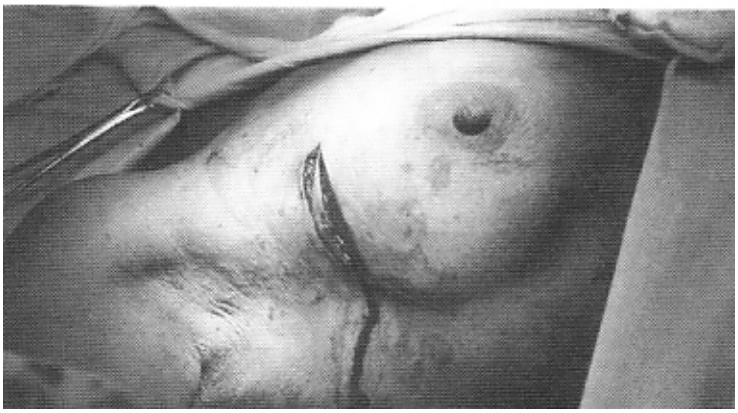

Fig. 1: CBS through a single breast incision.

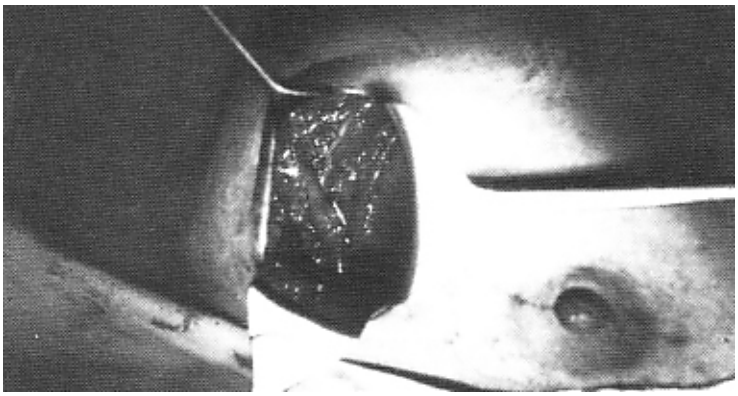

Fig. 2: Axillary evacuation through breast incision.

Fig. 3: Axillary evacuation through a regular axillary incision.

Fig. 4: Completed CBS through a single axillary incision. N.B. Patient injected with Paternt Blue for sentinel lymphadenectomy.

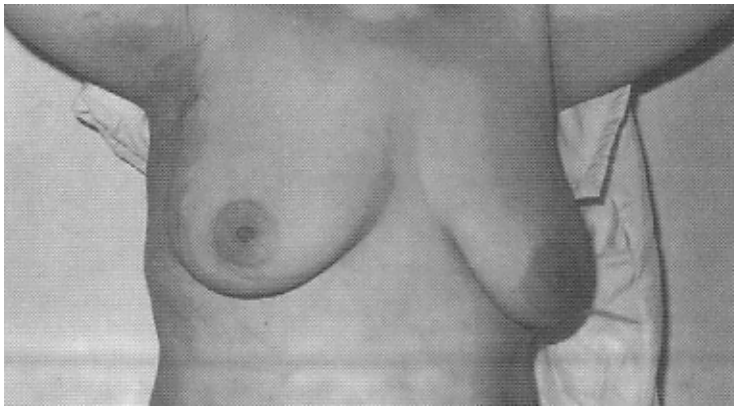

Fig. 5. Postoperative appearance after CBS through a single axillary incision

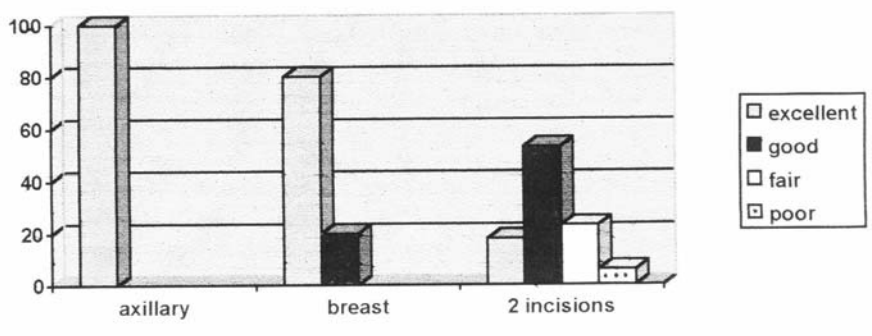

Fig. 6: Cosmetic outcome in relation to incision type

DISCUSSION

Christiaens et al. [7] studied how different surgeons in a University Hospital performed CBS, and found that much difference exists regarding the type of incision, extent of incision, surgical technique and extent of resection, so one can easily say that it is OK to be different.

The indications and contraindications of CBS is mentioned in table 3, we can safely say that our patients were well selected. Some controversy exists regarding some of our patients as to whether they were candidates for CBS or not, theses include:

1- Patients with EIC (vide infra).

2- Retroareolar tumors. Retroareolar tumors pose some problems for CBS. These include, high rate of involvement of the nipple areolar complex and the suboptimal cosmetic outcome after compromise of the nipple and areola, and increased risk of multicentricity. However, retroareolar tumors can still be treated with CBS with or without nipple-areolar preservation [8, 9].

The operations of WLE include excision of the tumor with 2 cm safety margin. The choice of the skin incision will depend upon which incision will give good access to the tumor and will heal in a cosmetically good fashion. Some authors excise breast tumors through axillary [10] and endoscopic [11, 12] approaches, also the IBTR after CBS usually develops in the breast parenchyma rather than in the skin [13] which could mean that the type of incision does not affect IBTR.

Our first change in attitude was in a patient with tumor in the UOQ. After performing the WLE we found ourselves on the Pectoralis major muscle, so we dissected its lateral edge and completed the axillary evacuation rather easily through the same breast incision. We continued performing this approach and found that accessibility to the axilla, from the Thoracodorsal neurovascular bundle to Halsted's Ligament, was almost perfect, hence avoiding an additional axillary incision with its associated time, morbidity and cost.

The second change in attitude was in a patient who had her tumor in the UOQ near the axillary tail. In this case we decided to excise the breast tumor through the same axillary incision We were satisfied with the exposure, despite its difficulty, and the beautiful postoperative results (Table 2) and decided to continue. Removal of the breast primary through a transverse axillary incision is not always easy and requires some traction and orientation to the field, so I would limit this approach, temporarily, to patients with tumors in or near the axillary tail, despite the fact that none of our 3 patients had a positive tumor margin on pathological examination, and none of them developed an IBTR. On reviewing the literature, we found only one author that performed tumor excision through the axillary incision [10]. He performed his procedure on 8 petients with UOQ tumors and did the quadrantectomy, clearance of level I and II axillary nodes and then transposed the latissimus dorsi muscle to fill the quadrantectomy bed through a single transverse axillary incision.

Our first concern regarding these 2 approaches was the oncological soundness. We assumed that the procedures are oncologically sound because the difference between our approach and the classic "2 incisions" approach is the free dissection of the lateral border of the pectoralis major muscle. On taking the tumor out passing through the axilla, this might allow, theoretically, some tumor cells to spill in the axilla, but these tumors are already in the UOQ or in the axillary tail (as we do not perform this procedure for tumors away from the axilla), so after performing CBS for these tumors through the classic 2 incisions, you usually find the 2 cavities already in continuity. Also this area is covered by the radiotherapy beam [5] and we found other authors like Shrotria [10] performing a similar procedure. Our second concern was that we communicated the tumor cavity with the axillary cavity and hence drain the tumor cavity, which is not preferred as it could lead to breast deformity [5]. However, we found that 100% of patients who had a single axillary incision, and 80% of patients who had a single breast incision had an excellent cosmetic outcome as compared with 18% of patients who had the classical 2-incisions (Table 2).

The problem with EIC [ductal carcinoma in-situ occupying 25% or more of the area encompassed by the infiltrating tumor and/or extending in grossly normal breast tissue [14]], is that it resembles normal breast tissue, and hence will mislead the surgeon during removal of the tumor who would feel, falsely, that he had reached a negative margin. This is why EIC used to be a contraindication to CBS [15] as the procedure would leave DCIS in place, which would lead to a positive margin and increase the incidence of IBTR. Nowadays, all you need to do is to totally excise the lesion with the aid of frozen section or Touch-prep cytology [14, 16, 17,18]. Luu et al.[19], noted that EIC is a factor that can increase the incidence of positive or close (< 2 mm) margins, therefore it is not surprising to find that 4/5 cases with posItive margins had EIC. Among the factors that can increase the fisk of IBTR are age, ER negative state [20], positive margins [21] and EIC. Patients with EIC have a 23%[22] to 27% [23] incidence of IBTR, versus 8% [22] to 10%[23] for patients with no EIC. Other authors [24, 25] agreed that EIC is considered to be an important risk factor for local recurrence, but none of them mentioned that it was a contraindication for CBS. On the other hand, Hurd et al. [14] and Gage et al [8] mentioned that EIC, if negative margins can be achieved, does not affect the disease-free survival rate or IBTR rate. EIC was present in the 2 cases that had an IBTR.

The 2 cases that developed an IBTR were present in the breast incision group, both had an EIC. The IBTR's were in the breast and not in the axilla, therefore was not due to a defect in axillary evacuation through the breast incision, but rather due to incomplete resection of the EIC. It is worthy of notice that one of them was pN0.

On dealing with cancer patients, cosmoses is usually not high on the priority list. However, in the breast it is usually high from the patient's point of view. Our best cosmetic results were in patients who had an axillary incision followed by those who had a single breast incision followed by those who had 2 separate incisions. It is generally accepted that 10-15% of cases might have an aesthetically unfavorable result after CBS [26, 27, 28]. Some of the factors that would influence cosmetic outcome is tumor size [with unfavorable outcome in T2 tumors (p=0.05)], volume of tissue resected, type of surgery, Radiotherapy dose, race and age [29].

Assessing the cosmetic outcome of patients is both subjective and objective. In our study, we did not do a subjective evaluation, but it is generally agreed that the cosmetic results are better subjectively than objectively [27, 30, 31] So our results would even be better if evaluated subjectively. Mills et al. [32] studied 64 patients for 3 years and found that 77% had excellent cosmoses, 21% good and 2% fair, and noticed that the cosmetic outcome was affected by volume of tissue resected [>70 cm^3 J rather than by tumor size per se. In our results in the single breast incision and in the single axillary incision are better than those reported by Mills et al. [32], but our results in the 2 incisions group did not meet his level.

CONCLUSION:

These 2 new types of breast incisions and approaches to CBS show a very promising future in relation to the classic procedures, each should be evaluated separately, with a larger number of patients, and by more than one surgeon.

REFERENCES

1. NIH Consensus Conference: Treatment of early-stage breast cancer. J. Am. Med. Association, 1991; 265: 391-395.

2. Borgen, P. I., Heerdt, A., Moore, M., Petrek, J.: Breast Conservation therapy for invasive carcinoma of the breast. In: Current Problems in Surgery, 1996; 36(2): 196-242.

3. Harris, J. R.: Staging of breast carcinoma. In: Harris, J. R., Morrow, M., Lippman, M. E., Hellman, S.: Diseases of the Breast. Lppincott-Raven. Philadelphia, New York. I 996: 457-460.

4. Nattinger A.B.; Hoffmann R.G., Kneusel R.T.; Schapira M.M.: Relation between appropriateness of primary therapy for early-stage breast carcinoma and increased use of breast-conserving surgery. Lancet 2000 Sep 30; 356 (9236): 1 148-53.

5. Harris, J. R., Morrow, M.: Local Management of invasive breast cancer. In: Harris, J. R., Morrow, M., Lippman, M. E., Hellman, S.: Diseases of the Breast. Lppincott-Raven. Philadelphia, New York. I 966: 487-547.

6. Gage, L., Recht, A., German, R.: Long-term outcome following breast conserving surgery and radiation therapy. Int. J. Radiol. Oncol. Biol. Phys. 1995; 33: 251.

7. Christiaens M.R. ; Cataliotti L; Fentiman I; Rutgers E; Blichert-Toft M; De Vries Graversen H.P.; Vantongelen K; Aerts R: Comparison of the surgical procedures for breast onserving treatment of early breast cancer in seven EORTC centers. Eur J Cancer 1996 Oct; 32A (11): 1866-75.

8. Haffty B.G., Wilson L.D., Smith R, Fischer D, Beinfield M, Ward 81 McKhann C.: Subareolar breast cancer: long-term results with conservative surgery and radiation therapy. Int J Radiat Oncol Biol Phys 1995 Aug 30;33 (1):53-7.

9. Gajdos C; Tartter P.I.; Bleiweiss I.J.: Subareolar breast cancers. Am J Surg 2000 Sep;180(3):167-70.

10. Shrotria, S.: Single axillary incisions for quadrantectomy, axillary clearance and immediate reconstruction with latissimus dorsi. Br. J. Plastic Surg. 2001; 54:128-131.

11. Tamaki Y, Sakita I, Monden M: Endoscopic partial mastectomy for breast cancer. Nippon Rinsho (Japan) Apr 2000, 58 Suppl : 178-84 (English abstract).

12. Sawai K.I. Nakajima H, Mizuta N, Minimally invasive surgery for breast cancer. Gan To Kagaku Ryoho (Japan), 2001, 28(8) p1063-70 (English abstract).

13. Mosny D.: Techniques of breast-conserving therapy in breast carcinoma. Schweiz Rundsch Med Prax 1995 Mar 28;84(13):374-6 (English abstract).

14. Hurd T.C., Sneige N, Allen P.K., Strom E.A., McNeese M.D.,: Impact of extensive intraductal component on recurrence and survival in patients with stage I or II breast cancer treated with breast conservation therapy. Ann Surg Oncol 1997 Mar; 4(2): 119-24.

15. Voogd A.C.; Peterse J.L.; Crommelin M.A.; Rutgers E.J.; Botke:G; Histological determinants for different types of local recurrence after breast-conserving therapy of invasive breast cancer. Dutch Study Group on local Recurrence after Breast Conservation (BORST). Eur J Cancer 1999 Dec; 35(13): 1828-37.

16. Freedman G, Fowble B, Hanlon A, Nicolaou N, Fein D, Hoffman J, Sigurdson E, Boraas M, Goldstein L.: Patients with early stage invasive cancer with close or positive margins treated with conservative surgery and radiation have an increased risk of breast recurrence that is delayed by adjuvant systemic therapy. Int J Radiat Oncol Biol Phys 1999 Jul 15;44(5):1005-15.

17. Hess C.F., Schmidberger H.: Adjuvant radiotherapy in the treatment of breast cancer.: Anticancer Res 1998 May-Jun;18(3C):2213-4.

18. Gage I, Schnitt S.J., Nixon A.J., Silver B., Recht A, Troyan SL, Eberlein T, Pathologic margin involvement and the risk of recurrence in patients treated with breast-conserving therapy Cancer 1996 Nov 1 78(9): 1921-8.

19. Luu H.H.; Otis C.N.; Reed W.P. Jr; Garb J.L.; Frank J.L.: The unsatisfactory margin in breast cancer surgery. Am J Surg 1999 Nov;178 (5):362-6.

20. Hery M; Teissier E: Conservative treatment. Nine years results of 295 node-negative pTl <10 mm, without adjuvant medical treatment. 21st San Antonio Breast Cancer symposium, San Antonio, Texas, 1998, in www.medscape.com.

21. Koyama H; Inaji H; Noguchi S; Motomura K: Recent Progress in Breast Conserving Therapy:From Experiences in Japan. Breast Cancer 1996 Dec 20;3(3): 151-160.

22. Leborgne F; Leborgne J.H.; Ortega B; Doldan R; Zubizarreta E: Breast conservation treatment of stage breast cancer: early patterns of failure. Int J Radiat Oncol Biol Phys 1995 Feb 15; 31 (4):765-75.

23. Fodor J; Major T; Polgar C; Toth J; Nemeth G: The impact of radiotherapy on the incidence and time of occurrence of local recurrence in early-stage breast cancer after breast conserving therapy. Neoplasma 2000; 47 (3): 181 – 6.

24. Wazer O.E., Schmidt-Ullrich R.K., Ruthazer R, DiPetrillo T, Boyle T, Kanski J, Safaii H: The influence of age and extensive intraductal component histology upon breast lumpectomy margin assessment as a predictor of residual tumor. Int J Radiat Oncol Biol Phys 1999 Nov 1; 45 (4): 885-91.

25. Jing X, Kakudo K.I. Murakami M.I. Nakamura Y, Nakamura M.I. Yokoi T, Oura S, Sakurai T.: Extensive intraductal component (EIC) and estrogen receptor (ER) status in breast cancer. Pathol Int 1998 Jun; 48 (6): 440-7.

26. Vitucci C, Tirelli C, Graziano F.I. Santoro E. Babiera G.V. Singletary S.E.: Results of conservative surgery for limited-sized infiltrating breast cancer: analysis of 962 tested patients: 24 years of experience. J Surg Oncol 2000 Jun; 74(2): 108-15.

27. Maessen O.I. Flentje M, Weischedel U. Cosmetic results of breast conserving therapy for breast carcinoma. Treatment results from the Heidelberg Radiation Clinic in the years 1984 to 1992. Strahlenther Onkol 1998 May; 174 (5): 251- 6 (English abstract).

28. Gabka C.J.; Baumeister R.G.; Maiwald G: Advancements of breast conserving therapy by oncoplastic surgery in the management of breast cancer. Anticancer Res 1998 May-Jun; 1 8 (3C): 2219 –24.

29. Taylor M.E.; Perez C.A.; Halyerson K.J.; Kuske R.R.; Philpoff G.W.; Factors influencing cosmetic results after conservation therapy for breast cancer. Int J Radiat Oncol Biol Phys 1995 Feb 1 5; 31 (4): 753-64.

30. D'Aniello C, Grimaldi L, Barbato A, Bosi B, Cani A.: Cosmetic results in 242 patients treated by conservative surgery for breast cancer. Scand J Plast Reconstr Surg Hand Surg 1999 Dec; 33(4): 41 9-22.

31. Kaija H, Rauni 8, Jorma I, Matti H.: Consistency of patient- and doctor-assessed cosmetic outcome after conservative treatment of breast cancer. Breast Cancer Res Treat 1997 Sep; 45 (3): 225-8

32. Mills J.M. Schultz, D.J., Solin, L.J.: Preservation of cosmoses with low complication risk after conservative surgery and radiotherapy for ductal carcinoma in situ of the breast. Int J Radiat Oncol Biol Phys 1997 Oct 1; 39 (3): 637-41